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THE PRODUCTION OF BABY BEEF

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LIVE-STOCK markets during recent years have experienced a constantly growing demand for well-fattened beef animals weighing from 900 to 1,200 pounds. This has been due to the increasing demand by beef consumers for light-weight, high-grade cuts. Such a demand must necessarily be supplied by well-finished animals from 14 to 20 months old, carrying a large percentage of the blood of one of the early-maturing beef breeds, usually that of the Hereford, Aberdeen-Angus, or Shorthorn. To distinguish them from animals of other beef classes, these yearlings have come to be designated as baby beeves. The preparation for market of this class of beeves requires more skill than is necessary in the production of animals marketed at more mature ages, since the growth in the latter is made largely on the cheaper roughages of the farm.

With the growing scarcity of feeder cattle and the advance in value of farm lands, the baby-beef industry is of increasing importance and is receiving the attention of farmers in all live-stock sections of the country. This bulletin deals with various phases of the production of baby beef for market.

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TENDENCY TOWARD EARLY MARKETING OF BEEF ANIMALS.

FEEDERS at the present time show an increasing tendency toward finishing off their beef cattle at younger ages. In general this tendency is created by two causes: First, consumers are demanding small, high-quality cuts of meat; second, the cost of producing beef, due to advance in land values, feeds, labor, and taxes, has increased to such an extent that feeders and breeders can seldom hold their cattle to advanced ages at a profit. General conditions in the past few years have indicated that no class of beef yet produced more nearly fulfills the requirements of both producer and consumer than baby beef, and the feeding of baby beeves has been increasing in popularity.

In the early days of the cattle industry steers were kept on the range until from 3 to 5 years of age. The use of better bulls with consequent improvement in quality and early maturity of market cattle, together with heavier grain feeding, has made it possible to put just as much flesh on the animals by the time they are from 10 to 20 months of age. With improvements in breeding and in feed-lot methods heavier cattle with more quality may in time be put on the market at even a younger age. The precise age at which steers should be marketed depends upon several conditions, and the individual feeder must necessarily answer this question for himself. It is intended, however, in the following pages to discuss rather briefly the conditions governing this as well as other phases of baby-beef production in such a manner as to help the feeder to solve such problems.

WHY BABY-BEEF FEEDING IS PROFITABLE.

In a general way the following are the advantages in favor of finishing cattle at younger ages rather than waiting an additional year or two before they are placed upon the market.

1. Young cattle make better gains than older cattle on the same quantity of feed. Yearlings can make 25 to 40 per cent more gain than mature cattle on the same feed. The quantity of feed necessary to make 100 pounds of gain increases with the age of the animal.

2. The herd of cattle on hand at any one time is smaller, since the breeder selling cattle as yearlings no longer has steers 2 or 3 years old on his farm. The surplus feed and pasture which becomes available when the cattle are sold before 2 years of age may be used for maintaining a larger breeding herd, and this provides for the production of a larger number of calves. By feeding calves as baby beef, the money invested can be turned over in 18 months or less.



FIG. 1.—This trio of calves illustrates the type approved by the producer of baby beef. They have been kept growing and have not been allowed to lose their milk bloom.

3. Open heifers when finished as baby beef at 900 to 950 pounds sell as well as steers. As a general rule it is better to dispose of them at such weights, although frequently well-finished heifers weighing up to 1,050 pounds are not discriminated against: When they are over 2 years of age, however, they seldom sell as well as steers, because heifers and cows carry a great deal of bunched internal fat, which makes them less desirable on the market.

4. Well-finished beeves when fattened for market under 2 years of age offer greater choice in the matter of selecting the date of marketing. The yearling of high quality can be fed either a somewhat shorter or longer time than first planned without any material change in "bloom" or finish (fig. 1). This is a decided advantage if the market is unsteady or weak. However, if market demand is steady,

as is usually the case with this type of beef, the good feeder will endeavor to market his animals when their bloom or finish is at its best.

5. The average consumer prefers the size and quality of the cuts which are obtained from the carcass of a well-bred highly finished yearling. In addition to high quality, thickness in steaks and other cuts of beef is desired by the consumer, and these can be produced more economically in the well-matured yearling than in any other class of beef animal. (Fig. 2.)

6. Markets are paying a premium for this type of beef, and the market for baby beef in recent years has been more stable than for



FIG. 2.—A prime baby beef. Note his depth, thickness, quality, and finish. The animal is a cross-breed—Hereford-Shorthorn.

any other class of cattle. During the last few years this class of beef has practically had a market of its own, and until packing centers can command a larger supply relatively greater stability in prices for fat yearling beef may prevail. Prime baby beef usually commands a price equal to that of the highest grade of mature fat cattle.

WHEN PRODUCTION OF BABY BEEF IS NOT ADVISABLE.

While the most favorable age for the marketing of the better types of beef cattle is under 2 years, the system can not be followed with all types of beef cattle or by all feeders. Some of the conditions

under which the finishing of cattle at this age is not advisable may be outlined as follows:

1. The farmer who is inexperienced in methods of beef production is not qualified to take up baby-beef production, but should take up one of the simpler systems. A system which may be adopted by such a feeder is that of the breeding up of a grade herd through the use of pure-bred bulls. For the first three or five years the produce of such breeding can be sold either as feeders at the yearling or 2-year-old age, or kept on a light ration or on grass until 2 years of age, when they can be fattened for market. (See fig. 3.) By beginning in this manner the farmer gains experience and at the same time builds up a



FIG. 3.—Heavy baby beeves. They are older than most baby beeves of to-day, but show quality, uniformity, and finish.

herd which in a few years will be good enough for the production of baby beef. In many cases lack of experience on the part of the feeder can be offset to a large extent if he will take advantage of the service and advice which are available for him through his State agricultural college.

2. Cattle with poor beef form or of poor quality are too slow in maturing and will not take on the fat and finish which is essential with baby beef. If the feeder decides that his calves are not good enough to sell as baby beef, he should either finish them off on somewhat coarser feeds for a later market or carry them until they are older before fattening them.

3. When the available feed consists chiefly of roughage, no attempt should be made to feed out calves as baby beef, since they require a larger proportion of grain and other concentrated feeds in their ration than more mature cattle. To produce baby beef grain must be fed

in considerable quantities from the time of weaning or before to the time of marketing, while more mature cattle may be fed largely or wholly upon roughages during the early part of the feeding period.

BREEDS SUITABLE FOR BABY-BEEF PRODUCTION.

The strictly beef breeds of the United States are the Shorthorn, Hereford, Aberdeen-Angus, Galloway, Polled Durham, and Polled Hereford. Each of the breeds mentioned has its points of excellence, and the matter of making a selection, while depending somewhat upon local conditions, rests largely upon the personal preference of the breeder. The problem of selecting the individual animals after



FIG. 4.—Thick-fleshed Shorthorn cows of good quality and conformity, suitable for the production of excellent baby beefes.

the breed has been determined is really of greater importance than the selection of the breed itself.

Farmers' Bulletin 612, "Breeds of Beef Cattle," discusses the characteristics of the different beef breeds. It may be obtained without charge by writing to the Department of Agriculture, Washington, D. C.

TYPE OF COWS TO USE.

In selecting cows from which baby beef is to be produced three very important factors should be kept in mind:

1. The cows should have at least a fair amount of beef blood. Pure breeds are not necessary, but two or three crosses of such breeding is essential. Cows with a preponderance of dairy blood will not do for the production of baby beef. (See fig. 4.)

2. Cows best suited for this type of breeding usually weigh 900 pounds or over in thrifty breeding condition. So long as early maturity is not sacrificed, the heavier cows are the most suitable for baby-beef production. Size of frame rather than weight should govern in selecting cows which are to be used for this purpose.

3. The cows used to produce baby beeves should produce enough milk to keep the calves fat and growing without much additional feed up to weaning time.

In addition to these three factors, such things as constitution, uniformity of breeding, color, size, and early maturity should be considered. (See fig. 5)



FIG. 5.—Aberdeen-Angus breeding cows that show uniformity of type and condition essential in producing calves suitable for baby-beef purposes.

TYPE OF BULLS TO BE USED.

As a general rule it may be said that lack of excellence in any one or all of the above-mentioned points in the cow may be offset through additional excellence in the herd bull. Some bulls seem to have sufficient prepotency to stamp their own excellence of form, type, and quality upon their calves regardless of the kind of cows in the herd. Such a bull is a very valuable asset to any breeder, and it is unfortunate that we can not tell absolutely what a bull will do in this respect until his offspring are seen. A bull coming from a line of ancestry which has been noted for its excellence of type, quality, milk-producing ability, and early maturity is more than likely to be a producer of animals like himself. This, together with individual excellence in the bull, is the only standard we have for forecasting the type of calves which an untried bull will get. For the producer of baby beef the additional sum paid for a good bull is money well spent.

Above all, a breeder in selecting a bull should procure one of good beef form and with a strong tendency toward earliness of maturity. (See fig. 6.) To a very large extent the breeder's success in raising and feeding baby beeves will depend upon the bull's ability to transmit this latter character to his calves. Quality and excellence of form in calves can not be obtained from poor breeding.

TYPE OF CALVES SUITABLE FOR BABY BEEF.

Calves to qualify as baby beef must have quality and finish. The consumer does not want the unfinished yearling, and the calf that does

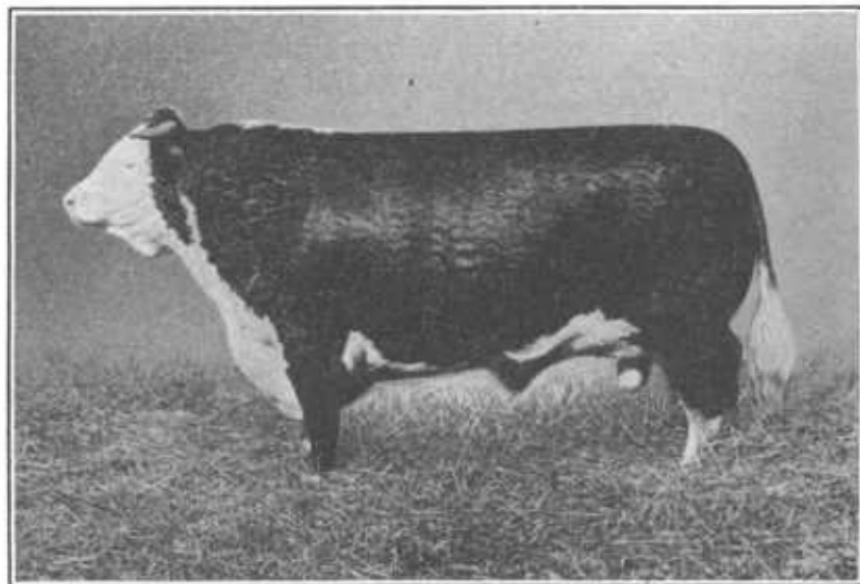


FIG. 6.—Bulls of high quality, showing thickness of flesh and early maturity tendencies, are desirable for siring.

not have quality will not take on a high finish. Neither will the calf lacking in early-maturing qualities fatten during the latter part of the feeding period, but instead it will use most of the feed which it consumes for growth. Keeping this in mind, the feeder should first determine whether his calves are good enough to compete on the fat-yearling market, and if he decides that they are not, they should be finished off on coarser feeds for a later market.

The wide, deep-bodied, thick-fleshed calf with short legs and an abundance of quality as indicated by fineness of hair, texture of skin, smoothness of flesh, and general refinement about the head and other parts of the body is the type best suited for making prime baby beef. Uniformity in size, weight, and color should not be overlooked, because such factors are an advantage in marketing. These points are of great importance in selecting calves to be finished as baby beef, and they deserve the strictest attention. (See fig. 7.)

MANAGEMENT AND FEEDING OF THE BREEDING HERD.**SIZE OF THE BREEDING HERD.**

Unless the breeder has some satisfactory method of marketing small lots of cattle, he should keep enough cows to produce at least one carload of baby beefes. A 36-foot car will hold approximately 27 head of calves averaging 950 pounds, or 25 head of 1,050-pound, calves. The average farmer can get an 85 per cent calf crop, and on this basis approximately 32 cows would be necessary to produce a carload of baby beefes a year.

Freight rates generally apply to a minimum weight per car, that is, the amount charged for freight is the same, even though the cars



FIG. 7.—A group of well-finished baby beefes showing the uniformity of type, size, and quality which command the top prices for this class of beef.

contain less than the minimum weight. Cattle ride better if the car contains the proper number. Either too few or too many in a car are bad, and the feeder will find it to his great advantage to have the car properly loaded.

In certain States have county or community live-stock shipping associations. Such organizations offer splendid opportunities for the shipper with less than a carload.¹

The following table shows the approximate number of cattle and calves which can be shipped in cars of different lengths:

¹ See Farmers' Bulletin 718, "Cooperative Live Stock Shipping Associations," and Department of Agriculture Bulletin 403, "Systems of Accounts for Live Stock Shipping Associations."

TABLE 1.—*Approximate number of cattle and calves that can be shipped in railroad cars of various lengths.*

Approximate weight of animals.	36-foot car.	38-foot car.	40-foot car.
400 pounds.....	45	48	52
600 pounds.....	38	40	42
800 pounds.....	30	32	34
950 pounds.....	27	28	30
1,050 pounds.....	25	26	27
1,150 pounds.....	22	23	24
1,200 pounds.....	20	22	23

Those feeders who have enough calves for two carloads have an advantage in that the animals can be graded, the better ones being placed in one car and the poorer ones in another; or, if the calves do not finish out uniformly, one carload can be shipped first, the other going later when finished.

The breeder who keeps a breeding herd of less than 30 cows will find that his bull charge per calf will be somewhat greater than when



FIG. 8.—A prime load of baby beefes. Grand champion carload at the International Live-Stock Exposition in 1916.

the bull is used on a larger herd. A well-matured bull can easily take care of 50 cows and oftentimes as many as 60. The breeder who does not keep enough cows to place the keeping of a bull on an economical basis will find an advantage in cooperating with a neighbor in the ownership of a bull.

The amount of pasture available is a governing factor in the size of the breeding herd. Great care should be taken that pastures are not overstocked. Good bluegrass or clover pastures will carry from 50 to 100 cows per 100 acres. Other pastures, with the exception of wheat, oats, or other small grains, will vary in carrying capacity from 50 down to 5 head per 100 acres. Pastures that do not furnish sufficient grass for one head to each 6 or 8 acres are hardly good enough for breeding cows intended for growing baby-beef calves.

The amount of roughage, such as silage, hay, stover, straw, etc., is another very important factor in determining the size of the breeding herd. The basal portion of the ration for the breeding herd should be made up of these rough feeds, and if such home-grown

feeds are not available, it is seldom advisable for the farmer to attempt to keep a herd of cows. From the stockman's standpoint the purchase of roughage at present prices is prohibitive, and the farmer who would realize the greatest profits from his breeding and feeding will plan to raise the feeds necessary for their maintenance.

BULL MANAGEMENT AND FEEDING.

The farmer with only a small number of cows will generally find it more economical to allow the bull to run with the herd. However, if the breeder wishes to breed the bull to 50 or 60 cows, which is the maximum number a mature bull should serve, the bull should be kept separate from the herd at all times and only one service should be allowed at each period of heat. Bulls running with the herd in large pastures will not get as many calves as when with the herd in a smaller pasture. Keeping the bull separate from the herd increases the cost of keeping him, but the bull cost per calf is usually cheaper except under range conditions or with very small herds. A mature bull when running with the cows in a small pasture should serve from 40 to 50 cows per year. Immature bulls should not be allowed to serve as many as this.

In feeding a bull care should be taken that he is kept in a thrifty condition. He should neither be pampered nor allowed to become thin. The grain ration may be judged almost entirely by his condition. A good grain mixture for the bull is one composed of one-fourth corn and three-fourths oats by weight. From 6 to 10 pounds daily of such a mixture for a 1,000-pound bull should be sufficient to meet all needs during the winter months. During the summer while on pasture he will need very little grain except during the breeding season, when he may be given daily from 3 to 5 pounds of the mixture mentioned above. Bran, barley, kafir, milo, etc., may be used in the bull ration if such feeds can be obtained at less expense than those mentioned.

The roughage ration should consist of some succulent roughage such as beets or silage, leguminous hay, as alfalfa or clover, and oat straw if it is available. A good roughage ration suitable for feeding when the bull is getting the grain ration mentioned above is 20 pounds of silage, 5 pounds of clover or alfalfa hay, and all the oat straw he will eat. The above weights are based on 1,000 pounds live weight. Johnson-grass hay, prairie hay, or mixed hays may be used in place of the roughages mentioned if prices warrant their use, but if any of these hays are used the grain ration should be slightly increased.

The bull should get plenty of exercise at all times. If kept in a stall or a small paddock he will not get the maximum number of calves. A roomy grass paddock where he can roam about at will is one of the best ways of giving him exercise. Nothing is better for the health and docility of a bull than moderate work in a treadmill.

BREEDING AND FEEDING THE COWS.

Uniformity in size and weight are very important factors in producing baby beef; therefore it is desirable that all the cows should calve within as short a period of time as possible. The average period of gestation for the cow is 283 days, or about 9½ months. To calve in April the cows should be bred during the latter part of June and up to the latter part of July. If the calves are desired in October the cows should be bred during December or January. The bull should be kept separate from the cows until the breeding season arrives. Every effort should then be made to get all the cows in calf during six weeks or two months, or in less time if possible. A cow generally comes in heat three times during 63 days, and those that are not in calf after three services should be disposed of.

Heifers should not calve before they are 27 to 30 months of age, and most heifers will do better if they are older than this at calving time.

Heifers and cows should be on pasture during as much of the year as possible. If pastures become short they should be fed a small quantity of grain. From one-half to 1½ pounds of cottonseed cake per day, depending upon the condition of the cows, is generally enough. If the grass is very sparse, silage or hay should be added to the ration, preferably the former. During the fall and early winter they will get good grazing in cornfields and meadows, although sometimes it will be necessary to supplement their feed at this time with a small quantity of roughage. It should be kept in mind that the most economical results in producing beef calves will be obtained when the cows are maintained largely on a roughage ration. At the present time silage is the most economical of all available farm roughages. Expensive hays should be avoided. Such feeds as straw and stover should be provided in such quantities as the cows will consume. Suitable winter rations for 1,000-pound breeding cows per day are as follows:

- | | | |
|---|--|----|
| 1. | | 4. |
| Cottonseed meal, 1½ pounds. | Corn, 3 pounds. | |
| Silage, 40 pounds. | Corn stover, 20 pounds. | |
| | Alfalfa or clover hay, 4 pounds. | |
| 2. | | 5. |
| Cottonseed meal, 1 pound. | Cottonseed meal, 2 pounds. | |
| Corn stover, 10 pounds. | Johnson grass, prairie, or mixed hay, 20 pounds. | |
| Oat straw, 5 pounds. | Corn stover, 10 pounds. | |
| Silage, 30 pounds. | | |
| 3. | | 6. |
| Cottonseed meal or linseed meal, 1 pound. | Corn-and-cob meal, 4 pounds. | |
| Shredded corn stover, 20 pounds. | Cottonseed meal or linseed meal, 4 pound. | |
| Clover hay, 4 pounds. | Hay (not leguminous), 15 pounds or unlimited. | |

In each of these rations the roughages such as silage, corn stover, and all hay except leguminous hays (alfalfa, clover, etc.) should be fed in such quantities as the animals will eat. The quantity of grain and clover or alfalfa hay fed should be controlled, and they should be given as the needs of the cows indicate. These are sample rations, and substitutions may be made as prices or availability of the feeds necessitate. The different constituents of these rations also may be increased or decreased as needed.

The table which follows may be of assistance in the management and feeding of the cow herd.

TABLE 2.—*Calendar of herd management in production of spring and fall calves.*

To produce spring calves.			To produce fall calves.		
Month.	What to do.	Feed.	Month.	What to do.	Feed.
July.....	Breed.....	Pasture with calves and bull.	January.....	Breed.....	Silage, 40 pounds; cottonseed meal, 2 pounds; or silage, 30 pounds, with corn stover or straw unlimited.
August.....		Pasture with calves.	February.....		Do.
September.....		Do.	March.....		Do.
October.....	Wean calves..	Pasture.	April.....		Do.
November.....		Do.	May.....	Wean calves..	Pasture.
December.....		Stalk fields, straw, meadow aftermath.	June.....		Do.
January.....		Corn silage, 40 pounds; cottonseed meal, 1½ pounds; or corn silage, 35 pounds, with stover unlimited.	July.....		Do.
February.....		Do.	August.....		Do.
March.....		Corn silage, 40 pounds; cottonseed meal, 1½ pounds; or corn silage, 35 pounds, with stover unlimited.	September.....		Pasture; 1 pound cottonseed cake.
April.....	Calves born..	Cottonseed meal, 2 pounds.	October.....	Calves born..	Do.
May.....		Pasture with calves.	November.....		Do.
June.....		Do.	December.....		Stalk fields, meadow aftermath; cottonseed cake, 2 pounds.

FEEDING THE HEIFERS.

Ordinarily, heifers intended for breeding purposes may be kept with the steer calves and fed in the same manner until the steers go on full feed. After this time the heifers should be fed separate from the breeding herd, and on a grain ration somewhat greater per 1,000 pounds live weight than that received by the cows. A good ration for heifers at this time is 2½ to 3 pounds of cottonseed meal or linseed meal with all the silage they will eat. When nearing maturity they may be fed with the cow herd. After about 9 months of age heifers will begin to come in heat, and until breeding time they should be kept separate from all bulls.

FALL OR SPRING CALVES.

Most of the calves on farms of this country are born during the spring months, but in recent years quite a number of farmers have adopted the fall calving plan.

The following seem to be the advantages of this system:

1. Calves born during the fall months are not bothered by flies, screw worms, maggots, etc., and hence they need less attention after castration and dehorning.

2. The young calf needs no grass until weaning time. The fall-born calf can therefore suckle its dam during the winter months and when weaned may go directly on pasture.

3. The fall-born calf fits in with pastures somewhat better than those born in the spring. His first summer is spent on the pasture, and at the end of this period he goes into the dry lot for finishing. On the other hand the spring-born calf must be fed during his first winter, and when the pastures are ready usually he can not be placed on them because he has reached the finishing period and should go into the dry lot.

4. The farmer who sells milk will derive greater profit when his cows freshen in the fall, since milk markets are better during the fall months.

5. Finishing calves in the fall and early winter interferes less with the other farm work than when it is done during the spring and early summer.

The disadvantages of fall calving are:

1. In extremely cold climates calves born in the late fall will suffer from the cold, and unless warm barns are available fall calving is not practicable.

2. More feed is necessary to maintain the cows when they are nursing calves, and during the winter months this will add somewhat to the expense of keeping the herd, since pastures are not always available.

3. Unless the farmer buys cows bred to calve in the fall he can not make the change from spring to fall calving without losing six months of service from the cows.

Those breeders who have tried the fall calving plan seem to favor it highly, but it will not work to advantage under all conditions.

BUYING OR RAISING CALVES.

In recent years the ranchmen of the West and South, more particularly the latter, have developed quite an industry in the breeding of high-quality calves which they furnish to feeders for finishing as baby beef. This system generally yields a fair profit to both breeder and feeder, but recent investigations indicate that the larger profits are gained where the calf is grown and fattened on the same farm.

With the development of drought-resistant grains, such as milo and kafir, ranchmen may find more profit in finishing the calves themselves rather than shipping them to corn-belt feed lots at weaning time.

With the feeder the buying of calves involves additional freight and commission charges as well as the paying of a profit to the breeder for growing the calves, all of which is saved when the feeder raises his own calves. However, if the feeder has not enough pasture or roughage to keep a breeding herd, or if the labor necessary to take care of a breeding herd is not available, it will, of course, be better for him to purchase his feeders.

SYSTEMS OF MANAGEMENT.

The distinction between different systems of management of the breeding herd and the calf herd chiefly pertains to the methods of handling and feeding the calves up to weaning time. The four systems practiced most extensively in the United States are those which have been arbitrarily named as follows:

1. The beef system, in which the cows are kept strictly for the calves they produce, and all calves are allowed to nurse their dams. Such calves usually run with their dams at all times.

2. Double nursing, or the system whereby some of the cows are required to suckle two calves rather than one, the cows without calves being milked.

3. Partially milked, or the system of allowing the calves to take a portion of the milk, the balance being hand milked.

4. Dual purpose, where the herds are kept for both beef and milk purposes. Under this system the cows are milked and the calves are raised on skim milk and grain.

The straight beef system is advisable in cases where the cows do not give enough milk to justify milking or where the cow herd is too large to permit of milking, where good feeds are scarce, when the cattle are kept under range conditions, where labor is very high or unobtainable, where the calves are allowed to take all the milk in order to get the greatest growth possible, or where the farm is not located near a good market for milk products. A great advantage in this system is that the calves can be allowed to run continuously with their mothers. When on pasture the cattle need very little attention, while with the other systems the handling of the herd involves additional attention and labor.

The double-nursing system appears to be the best where the cows are milked. An investigation recently completed by the Department of Agriculture¹ seems to indicate that this system is the most economical of all beef-producing systems used in the corn belt. The

¹ Report No. 111, Office of Secretary, "Methods and Cost of Growing Beef Cattle in the Corn Belt States."

additional profits come through the sale of milk and milk products. The system, however, is advisable only where the breeding herd is composed of heavy milking cows.

The partial-milking system is used more extensively in the Southeast than in any other section. It involves a great deal of trouble and labor and is not practicable on the average beef-producing farm.

The dual-purpose system does not generally yield very satisfactory results in raising calves to be finished out as baby beef, because it is very difficult to grow such calves on skim milk. Calves grown in this manner lose their baby fat, and few feeders can get the growth and finish out of such calves in time to sell them as baby beef.

The first two systems mentioned, the beef and the double-nursing, are the two which will be found most satisfactory for the production of prime baby beef.

CALF MANAGEMENT AND FEEDING.

DEHORNING, CASTRATION, AND VACCINATION.

Of the many problems confronting the producer of baby beef, those of greatest importance during the first six months of the calf's life, aside from that of feeding, are the castration, dehorning, and vaccination of the calf. Some breeders very successfully perform all of these operations at one time. When dealing with spring-born calves, these are generally operated upon during the late fall months when around 6 months of age (see Tables 3 and 4). This method is recommended, as it saves labor in the actual operation as well as in the care of the calf afterwards.

Calves can be dehorned successfully through the use of caustic potash on the horns when the calf is under 10 days of age. However, good results will usually be obtained and less labor is involved if the horns are sawed off when the calf is around 6 months of age, as mentioned above. When sawing off the horns the operator should be careful that about one-quarter of an inch of hair and skin is removed with the horn. During fly time pine tar may be used over the wound to prevent screw-worm or maggot infestation.

Losses through castration generally occur through improper wound drainage and can be prevented if the castration wound is made large enough. In making the cut through which the testicles are to be removed, the scrotum is grasped in the left hand and a slit is made from one end of the scrotum to the other over each testicle with a sharp knife which is held in the right hand. The testicles are then forced one at a time through the openings. The cords may be severed either by scraping with a knife or through the use of a castrating instrument made for this purpose.

In localities where blackleg is prevalent all calves should be vaccinated so as to prevent this disease. The first vaccination, as stated above, may be made at the time of dehorning and castration. In

some communities it is advisable to vaccinate once each six months, as the vaccine gives only temporary immunity. The vaccination is generally done during both the spring and fall months.

FEEDING THE CALF FROM BIRTH TO WEANING TIME.

Unless the cows in the herd are exceptional milkers, calves intended for baby beef should be fed a conservative ration of grain, beginning as soon as the calves will eat grain. Nothing so stimulates growth and early maturity as milk sucked fresh from the dam, but in all cases baby-beef calves should be fed liberally on grain for at least one month before weaning time. They can be started on grain when 4 to 6 weeks of age, with the crushed grains of corn, kafir, milo, barley, wheat, or oats, etc. The first mentioned is well suited to their needs. After a few weeks the grain may be given whole.

WEANING.

As weaning time is the crucial period with baby-beef calves, every effort should be made to get them through this period without the loss of their calf fat. The grain ration should be increased to the extent that the loss of their milk after weaning will cause very little change in their growth and fattening. Some feeders provide "creeps" for their calves at this time. These creeps are built in the pastures or in the lots so that the calves can get their grain without disturbance from the cows. They consist of small pens fitted with openings of such size as to permit only the calves to enter. These openings should have rollers on each side so as to prevent bruising or other injury to the calves when entering the pen.

Calves should be weaned gradually. If they are running with the cows at all times, the weaning may be started by keeping them up and allowing them to suck only twice each day for five or six days, after which they should be allowed to suck only once a day for a similar period. Then one day's sucking may be omitted, and later on two days may be skipped. The entire weaning should take from 10 to 15 days.

Fall-born calves should not be weaned until after the cows and calves are on grass. Spring-born calves should be weaned early enough in the fall to allow them some time on grass if possible. It is advisable to provide them with winter pastures such as wheat, oats, rye, barley, etc.

FEEDING THE CALF FROM WEANING TIME TO MARKET.

The feeding and management of the calf after weaning time depends greatly upon the time of the year when it was born and the age at which it is to be sold. Calves that are born in the spring are fed and managed differently from those born in the fall. The calf intended for market at 15 months of age must be fed and handled somewhat differently from those intended for sale at 18 months of age. To aid

the feeder in handling calves under these different conditions the two tables which follow are given. Table 3 deals with spring-born calves and Table 4 with those born in the fall. The data in both of these tables will vary with the time of birth and the length of the feeding period.

TABLE 3.—*Calendar of management and feeding for spring-born calves to be finished in 15 and 18 months, respectively.*

Month.		Calves to be finished in 15 months.		Calves to be finished in 18 months.	
1	March.....	Born.....	With cows. On grass or milk. do..... do.....	Born.....	Same as 15-month calf.
2	April.....				Do.
3	May.....				Do.
4	June.....		With cows. On grass or milk; begin feeding shelled corn or corn meal, $\frac{1}{2}$ to 1 pound.		Do.
5	July.....		With cows. On skim milk or grass; corn meal, 2 pounds.		Do.
6	August.....	Wean.....	On grass with cows or on skim milk; chopped corn, $\frac{1}{2}$ pounds.	Wean.....	Do.
7	September.....	Vaccinate, castrate, and dehorn.	Pasture; chopped corn, 4 pounds; silage and hay if necessary.	Vaccinate, castrate, and dehorn.	Do.
8	October.....	do.....	Pasture; chopped corn, 5 pounds; silage, 10 pounds.do.....	Do.
9	November.....	Dry lot.....	Corn, 6 pounds; cottonseed meal, $\frac{1}{2}$ pound; silage, 8 pounds; oat straw, unlimited; clover, 3 pounds.		Stalk fields, meadows; corn, 4 pounds; cottonseed meal, $\frac{1}{2}$ pound; silage, 5 pounds; straw.
10	December.....	do.....	Corn, 7 pounds; cottonseed meal, $1\frac{1}{2}$ pounds; silage, 10 pounds; clover, 3 pounds; oat straw, unlimited.		Corn, 5 pounds; cottonseed meal, 1 pound; silage, 10 pounds; oat straw, unlimited.
11	January.....	do.....	Corn, 8 pounds; cottonseed meal, $1\frac{1}{2}$ pounds; silage, 12 pounds; clover, 3 pounds; oat straw, unlimited.		Corn, 6 pounds; cottonseed meal, 1 pound; silage, 10 pounds; oat straw, unlimited.
12	February.....	do.....	Corn, 9 pounds; cottonseed meal, 2 pounds; silage, 10 pounds; clover, 3 pounds; oat straw, unlimited.		Corn, 7 pounds; cottonseed meal, 1 pound; silage, 10 pounds; oat straw, unlimited.
13	March.....	do.....	Corn, 10 pounds; cottonseed meal, 2 pounds; silage, 9 pounds; clover, 3 pounds; oat straw, unlimited.	Heavy feed; or pasture, with grain.	Corn, 8 pounds; cottonseed meal, 1 pound; silage, 12 pounds; oat straw, unlimited.
14	April.....	do.....	Corn, 11 pounds; cottonseed meal, 2 pounds; silage, 8 pounds; clover, 3 pounds; oat straw, unlimited.	In dry lot.....	Corn, 9 pounds; cottonseed meal, 1 pound; silage, 14 pounds, or pasture; oat straw.
15	May.....	Sell.....	Corn, 12 pounds; cottonseed meal, $2\frac{1}{2}$ pounds; silage, 8 pounds; clover hay, 3 pounds; oat straw, unlimited.		Corn, 10 pounds; cottonseed meal, $1\frac{1}{2}$ pounds; silage, 14 pounds, or pasture; oat straw, unlimited.
16	June.....				Corn, 11 pounds; cottonseed meal, 2 pounds; silage, 16 pounds, or pasture; oat straw, unlimited.
17	July.....				Corn, 12 pounds; cottonseed meal, 2 pounds; silage, 15 pounds, or pasture; oat straw, unlimited.
18	August.....			Sell.....	Corn, 14 pounds; cottonseed meal, $2\frac{1}{2}$ pounds; silage, 12 pounds, or pasture; oat straw, unlimited.

TABLE 4.—*Calendar of management and feeding for fall-born calves to be finished in 15 to 18 months, respectively.*

Month.		Calves to be finished in 15 months.		Calves to be finished in 18 months.	
1	October...	Born.....	With cow.....do..... With cow, small amount hay and grain.	Born.....	Same as 15-month calf. Do. Do.
2	November...		With cow; corn meal, 1 pound; hay, unlimited.		Same as 15-month calf; grain and hay, 1 pound.
3	December...		With cow; grain, 2 pounds; hay, unlimited; small amount silage.		Same as 15-month calf; grain and hay, 2 pounds.
4	January...		With cow; grain, 3 pounds; hay, unlimited; pasture.	Castrate, de-horn, vaccinate.	Do.
5	February...	do..... Pasture; grain, 4 pounds; hay or silage, if necessary.	Wean.....	Do.
6	March....	Castrate, de-horn, vaccinate.	Pasture; grain, 5 pounds; hay and silage, if necessary.		Same as 15-month calf; grain, 2 pounds.
7	April...		Pasture; grain, 6 pounds; small amount of hay and silage.		Same as 15-month calf; grain, 3 pounds.
8	May...	Wean	Corn, 8 pounds; cottonseed meal, 1½ pounds; silage, 12 pounds; clover, 4 pounds; oat straw, unlimited.	Wean.....	Do.
9	June...		Corn, 9 pounds; cottonseed meal, 2 pounds; silage, 12 pounds; clover, 3 pounds; oat straw, unlimited.		Do.
10	July...		Corn, 10 pounds; cottonseed meal, 2 pounds; silage, 10 pounds; clover, 3 pounds; oat straw, unlimited.		Do.
11	August....	Dry lot or heavy feed; on pasture.	Corn, 11 pounds; cottonseed meal, 2½ pounds; silage, 9 pounds; clover hay, 3 pounds; oat straw, unlimited.		Pasture; grain, 3 pounds.
12	September		Corn, 12 pounds; cottonseed meal, 2½ pounds; silage, 8 pounds; clover hay, 3 pounds; oat straw, unlimited.		Do.
13	October...		Dry lot.....		Pasture; grain, 5 pounds.
14	November...		Corn, 12 pounds; cottonseed meal, 2½ pounds; silage, 14 pounds; alfalfa or clover, 2 pounds; oat straw, unlimited.		Corn, 7 pounds; cottonseed meal, 1½ pounds; silage, 14 pounds; alfalfa or clover, 2 pounds; oat straw, unlimited.
15	December...	Sell.....	Corn, 12 pounds; cottonseed meal, 2½ pounds; silage, 15 pounds; alfalfa or clover, 3 pounds; oat straw, unlimited.		Corn, 10 pounds; cottonseed meal, 2 pounds; silage, 20 pounds; alfalfa or clover, 3 pounds; oat straw, unlimited.
16	January...				Corn, 10 pounds; cottonseed meal, 2½ pounds; silage, 20 pounds; alfalfa or clover, 3 pounds; oat straw, unlimited.
17	February...				Corn, 12 pounds; cottonseed meal, 2½ pounds; silage, 18 pounds; oat straw, unlimited.
18	March...			Sell.....	Corn, 14 pounds; cottonseed meal, 2 pounds; silage, 15 pounds; oat straw, unlimited.

The rations indicated in the foregoing tables consist of corn, cotton-seed meal, corn silage, clover hay, and oat straw. Other feeds may be substituted in the place of these. Barley, milo, kafir, and similar grains may be used in the place of the corn, but slightly larger quantities should be fed. Linseed-oil meal may be used in place of cotton-seed meal. When neither of these meals is available, the roughage should consist chiefly of a high-grade leguminous hay. Alfalfa or other leguminous hays may be used in place of clover hay. Other silages, or beets, may be used instead of corn silage.

Oat straw is a valuable addition to all baby-beef rations, not because of its nutritive value but because of its slightly laxative and alterative effect. When available, oat straw should be kept before the calves at all times.

Outside of the class of feeds mentioned above there are a few that are highly effective in the finishing of baby beef. It has been found at experiment stations that rations consisting of a grain, some kind of oil meal, a succulent feed such as silage or beets, and a leguminous hay, such as clover or alfalfa, are generally productive of the best results. Some feeders, however, are finishing a fair type of baby beef on simpler rations.

Average rations suitable for the last six months of the feeding period are as follows:

1.		5.	
Corn, 10 pounds.		Kafir or milo chop, 12 pounds.	
Cottonseed meal, 2 pounds.		Cottonseed meal, 2 pounds.	
Clover hay, 3 pounds.		Silage (corn, kafir, milo, or cane), 12 pounds.	
Corn silage, 10 pounds.			
2.		6.	
Corn-and-cob meal, 15 pounds.		Corn, 8 pounds.	
Linseed-oil meal, 2 pounds.		Oats, 3 pounds.	
Clover hay, 3 pounds.		Clover hay, 3 pounds.	
Corn silage, 7 pounds.		Corn silage, 10 pounds.	
3.		7.	
Corn, 10 pounds.		Corn, 12 pounds.	
Cottonseed meal, 1½ pounds.		Alfalfa hay, 7 pounds.	
Alfalfa hay, 6 pounds.			
Oat straw, unlimited.			
4.		8.	
Barley, 12 pounds.		Corn, 6 pounds.	
Beets or roots, 10 pounds.		Molasses, 2 pounds.	
Alfalfa hay, 5 pounds.		Cottonseed meal, 1½ pounds.	
Straw, unlimited.		Mixed hay, unlimited.	

These rations are average for the main feeding period. A small quantity of grain is fed at the start, and the quantity is increased throughout the entire feeding period. Corn may be increased at the rate of about 1 pound a month, or more if the calves will take it. Cottonseed or linseed-oil meal may be increased from one-fourth of a pound a day to 2 pounds during the first six or eight weeks. If silage is fed a light ration is given at first, which is increased as rapidly as the calves will take it until the last six weeks of the feeding period, when it is decreased so that the grain ration may be increased.

MANAGEMENT OF CALVES ON PASTURE.

With good pastures the roughage portion of the calves' ration may be eliminated. The grain portion of the ration in some cases may be slightly reduced, although as a rule the calves should be given all the grain they will eat while on pasture. It is seldom advisable to carry calves through the entire finishing period on grass. A better finish is obtained when they are dry fed during the latter portion of the period. It is never advisable to change calves from the dry lot to pastures when on full feed. It is safe, however, to change from pastures to the dry lot during this period.

When pastures are very good some trouble may be experienced in getting the calves to consume enough grain for the best results. In such cases it is generally better to keep them away from the grass during a portion of each day.

In sections where winter pastures can be grown the feeder should make a strong effort to provide such pasture during the cold season, as the green feeds greatly reduce the cost of both growing the calves and fattening them.

HOGS FOLLOWING BABY BEEVES.

Hogs should always be permitted to follow baby beefes to utilize any grain which may be wasted by them, also the undigested grain found in the droppings. Good, thrifty shoats weighing from 70 to 100 pounds are best suited for this purpose. Heavy hogs in good condition are not active enough, and young pigs are unsatisfactory because of the danger of getting crippled or otherwise injured by the cattle.

The number of shoats to use depends on the kind of grain being fed, the quantity, whether ground or fed whole, the price, etc. If grain is cheap and is fed lavishly, or if extra grain is fed to the hogs, one pig may be allowed for each calf. Ordinarily one pig may be permitted to follow two calves, and if necessary some grain other than what is obtained from the droppings is fed in order to finish the hogs in 90 to 100 days, so that another lot of shoats may be put in the lots to be finished by the time the calves are ready to market.

The quantity of pork produced is quite an important item in fattening baby beef, as the profit made on the hogs materially influences the returns from the entire feeding operation. From 1 to 2 pounds of pork may be obtained for each bushel of shelled corn fed to the calves.

If extra grain is fed to the hogs it should be given before the calves are fed and at some distance from the feed bunks. A separate feeding floor, watering facilities, and sleeping quarters should be provided for the hogs.

